Purpose:Tissue obliquity is a common problem in conventional radiotherapy to head and neck region. This results in generation of hot spots and non-uniformity of dose in the planned treatment volumes. Ellis compensators made of non divergent aluminum metal rods have been suggested. The purpose of this study is to develop a divergent wax based tissue compensator (DWTC) to address tissue obliquity and verify it dosimetrically before clinical implementation.

Methods:A method is developed for a photon field of size 20 cm X 20 cm from a telecobalt machine having Source Skin Distance (SSD) of 80 cm and Source Diaphragm Distance (SDD) of 45 cm. A jig was made with 3 Perspex sheets kept at specified distances which were perforated to allow radial divergence of metal spokes (depicting pencil beams) to pass through. Dose compensator is fabricated with dental wax based on the measured tissue thickness variations in different planes. Patient anatomy was reproduced on a POP which was placed at the bottom of the jig and a divergent compensator was developed at the top of the jig by placing wax on the upper end of the metal spokes. The efficacy of DWTC in the treatment plane was confirmed with Imatrix device using a wedge shaped and two semi neck water phantoms with and without compensators.

Results:The profiles with and without compensator verified by Imatrix device showed adequate tissue compensation for clinical purposes. The uniformity of the dose in the treatment region is well within 3%, 3mm criteria (dose evaluation parameter).

Conclusions:The method developed for DWTC could be adopted for a linear accelerator with different SSD and SDD. The entire process of making a DWTC is simple, accurate and can be easily fabricated.